

REMARKS

Applicants appreciate the thorough review of the present application as reflected in the Final Action mailed April 26, 2004. Applicants also appreciate the indication of allowance of Claims 1-3, 5-15, 17-21, 57 and 58.

To expedite prosecution of the present application and to narrow issues for appeal if an appeal is required, Applicants have cancelled independent Claims 61 and 62. Accordingly, Applicants request entry of the present Amendment After Final as Applicants submit that the Amendment After Final raises no new issues and narrows the issues for appeal. Applicants also request that the Examiner take one final look at Claims 33-46, 59 and 60 in light of the comments herein as Applicants submit that these claims are patentable over the cited references.

The IDS Materials

Applicants wish to bring to the attention of the Examiner a Supplemental IDS that was filed April 14, 2004 in the present case. These materials were cited in an Official Action that rejected claims of United States Patent Application Serial No. 10/382,826, which is a divisional application that claims priority from the present application.

Other Patents

Applicants wish to bring to the Examiner's attention, United States Patent Nos. 6,437,371 and 6,528,373 both of which are assigned to the assignee of the present application and claim priority from the issued parent patent of the present application, United States Patent No. 6,246,076.

The Obviousness Rejections

Claims 33-46

Claims 33-46 stand rejected under 35 U.S.C. § 103 as obvious in light of Dimitrijevic, "Nitridation of Silicon-Dioxide Films Grown on 6H Silicon Carbide" (hereinafter "Dimitrijevic") and United States Patent No. 5,479,316 to Smrtic (hereinafter "Smrtic"). Final Action, p. 2. Applicants appreciate the withdrawal of the rejection of Claims 33-46 as obvious in light of Wang and Smrtic. Applicants will address the rejection based on Dimitrijevic and Smrtic below.

Claims 33-46 each recite a dielectric material that is "silicon oxynitride having a formula $\text{Si}_3\text{N}_{4-X}\text{O}_X$, where $0 < X < 1$." As discussed in the present specification,

silicon oxynitride is defined as an oxygenated nitride. Specification, p. 18, lines 3-5. In particular, the specification states that "[o]xynitride refers to a nitride layer deposited in the presence of an oxygen precursor, such as nitrous oxide (N_2O), thereby introducing oxygen into the layer." Specification, p. 18, lines 3-5. The Final Action cites to the previous Official Action which relies on Dimitrijević as teaching these recitations of the claims. Final Action, p. 2.

As discussed in Applicants' previous response, Dimitrijević does not describe silicon oxynitride as is recited in Claims 33-46. Dimitrijević describes a nitrided oxide, not an oxygenated nitride. *See* Dimitrijević, Title. It appears the Dimitrijević describes formation of an oxide followed by a nitridation in either NO or N_2O . Dimitrijević, p. 175. As such, Applicants submit Dimitrijević does not disclose or suggest deposition of a nitride layer in the presence of an oxygen precursor, as Dimitrijević grows an oxide in O_2 and then nitridates that oxide.

In response to these arguments, the Final Action asserts that Dimitrijević "defines regions of SiNO material particularly at the interface of the SiC and at the surface of the oxide where the composition of the material meets the claimed recitations." Final Action, p. 3. However, Dimitrijević never states this proposition and such a proposition appears to be conjecture on the part of the Examiner. While Dimitrijević does state that the stability of oxides grown on nitrogen-doped SiC can be explained by the nitrogen present at the interface before nitridation treatment, such a statement does not establish that an oxygenated nitride of the formula $\text{Si}_3\text{N}_{4-x}\text{O}_x$, where $0 < x < 1$, is present at the interface as recited in Claims 33-46. Applicants submit that an obviousness rejection may not be properly based on conjecture.

Furthermore, Applicants submit that there would be no motivation to combine the nitrided oxide of Dimitrijević with Smrtić to result in the recitations of the claims. In particular, as acknowledged by the Examiner, Dimitrijević relates to nitrogen that is present at the interface between a SiC layer and a SiO_2 layer. Dimitrijević concludes that "a stable nitrided interface is created during oxidation in the case of nitrogen-doped N-type SiC substrates" and that "oxides grown on P-type can be improved by NO annealing, but not by N_2O annealing." Dimitrijević, Conclusion, p. 177. Thus, it appears that Dimitrijević suggests that a nitrided interface between SiC and silicon dioxide may be beneficial. However, in the MIM capacitor or interconnect of Claims

In re: Das et al.
Serial No.: 09/878,442
Filed: June 11, 2001
Page 11 of 11

33-46, no such interface exists. Accordingly, Applicants submit that one of skill in the art would not have been motivated combine the nitridation of Dimitrijevic with the capacitor of Smrtic because the interface that Dimitrijevic was attempting to improve does not exist in the capacitor of Smrtic. Furthermore, Smrtic does not disclose or suggest using an oxygenated nitride as the capacitor dielectric. Accordingly, Applicants submit that there is no motivation in Smrtic or Dimitrijevic to combine Dimitrijevic and Smrtic in the manner recited in Claims 33-46.

In light of the above discussion, Applicants submit that the recitations of Claims 33-46 are neither disclosed nor suggested by the cited combination of references.

Conclusion

In light of the above amendments and remarks, Applicants respectfully submit that the above-entitled application is now in condition for allowance. Favorable reconsideration of this application, as amended, is respectfully requested. If, in the opinion of the Examiner, a telephonic conference would expedite the examination of this matter, the Examiner is invited to call the undersigned attorney at (919) 854-1400.

It is not believed that an extension of time and/or additional fee(s), including fees for net addition of claims, are required, beyond those that may otherwise be provided for in documents accompanying this paper. In the event, however, that an extension of time is necessary to allow consideration of this paper, such an extension is hereby petitioned under 37 C.F.R. §1.136(a). Any additional fees believed to be due in connection with this paper may be charged to our Deposit Account No. 50-0220.

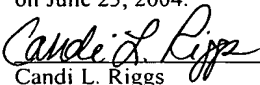
Respectfully submitted,



Timothy J. O'Sullivan
Registration No. 35,632

Customer Number: 20792

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Mail Stop AF, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on June 25, 2004.



Candi L. Riggs
Date of Signature: June 25, 2004